# Diminishing Manufacturing Sources and Material Shortages Management Plan Guidance

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# Foreword

The following provides guidance for developing Diminishing Manufacturing Sources and Material Shortages (DMSMS) management plans and delineates the minimum information required for all levels of leadership to properly manage DMSMS. This guidance is not intended as a DMSMS tutorial. Additional background information can be obtained from the Defense Acquisition University (www.dau.mil) or Department of Defense (DoD) DMSMS Center of Excellence (www.dmsms.org).

Since programs vary in complexity and scope, this guidance does not provide a standard template or specific format; rather, it delineates essential requirements to be addressed when implementing a DMSMS program. Existing DMSMS management plans should be assessed against this guidance to ensure applicable items are addressed. Programs that have blocks or upgrades can document any unique requirements in appendices if the overall DMSMS management approach applies across all blocks or upgrades. In addition, programs that are used across multiple platforms (e.g., Tactical Air Navigation) need to ensure its DMSMS management programs are integrated with the host platform's DMSMS program.

DMSMS management is an essential part of total life cycle system management. Implementation of the DMSMS management plan must begin with the concept design phase of a program and continue throughout its entire life cycle.

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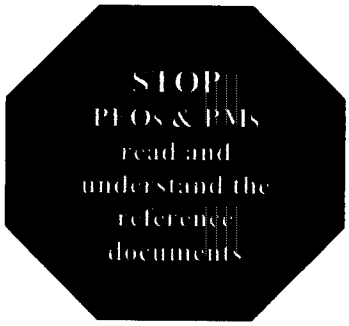
# INTRODUCTION

## Objective

Document the program's Diminishing Manufacturing Sources and Material Shortages (DMSMS) management plan in accordance with the following policies and guidance:

- DOD 4140.1-R, DOD Supply Chain Material Management Regulation, 23 May 03
- NAVSO P-3692, Independent Logistics Assessment Handbook, 30 Dec 03
- DASN(L) Memo, DMSMS, 10 May 04
- DASN(L) Memo, Evaluation Criteria for DMSMS, 20 Aug 04
- SECNAV Instruction 5000.2C, 19 Nov 2004
- ASN(RD&A) Memo, DMSMS Management Guidance, 27 January 05




## Scope

Specify the system or platform that this plan is applicable to, such as:

- System, sub-system, block or upgrade;
- Primary office of responsibility;
- Transition of responsibilities;
- Interrelated systems and its DMSMS management plans; and
- Unique requirements should be documented in appendices if the overall DMSMS management approach applies across all blocks or upgrades.

## System Description

Provide a brief description of the system.

# MANAGEMENT

## Approach

Define the DMSMS management approach and strategy, for example, the level of indenture and DMSMS management strategy (organic, commercial, Performance Based Logistics (PBL), field-activity managed, etc.). If multiple strategies are utilized, provide a description of each.

## Budgeting and Funding

Address the program's plan to budget and fund DMSMS efforts (e.g., the level of funding required by appropriation type) and the methodology for estimating DMSMS portion of Total Ownership Cost (TOC). This plan should include management and mitigation efforts throughout the life cycle that should be considered in the appropriation process. DMSMS budgeting and funding information should be documented in the Logistics Requirements Funding Summary (LRFS) or similar document (i.e., NAVSO P-3692, "*Independent Logistics Assessment*

*Handbook*"). Budget planning decisions for DMSMS should reference the sponsor's decisions. Table (1) provides a hierarchy of cost avoidance methodology recommended in order of priority.

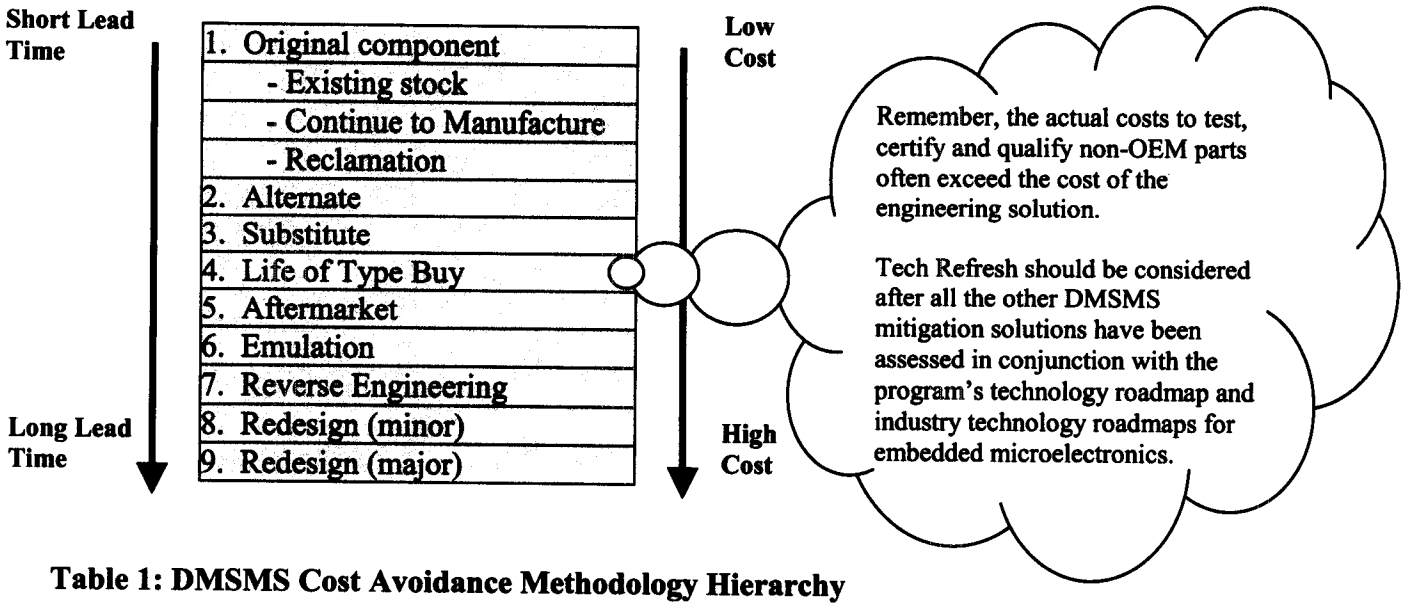



**Table 1: DMSMS Cost Avoidance Methodology Hierarchy**

Note. The Defense MicroElectronics Activity (DMEA) Cost Avoidance Values, at the board level, can be located in the DMSMS Acquisition Guidelines: (DMSMS Acquisition Guidelines, paragraph 2.5, or (http://www.dmea.osd.mil/docs/acquisition_guidelines.pdf). Depending on the complexity of the problem, the actual mitigation cost normally exceeds the projected cost in the DMEA model. For example, the costs to test, certify and qualify non-Original Equipment Manufacturer (OEM) parts are significant and can often exceed the cost of the engineering solution. Costs to the fleet in diminished operational availability and mission are normally not considered but are usually the greatest cost resulting from DMSMS.

## Contractual Requirements

Describe the contracting approach, to include Performance Based Logistics (PBL) relating to DMSMS and any applicable contract requirements. Items for consideration include incentives, deliverables, periodicity for monitoring DMSMS, performance, and exit criteria. Appendix (A) provides a sample Data Item Description (DID) that identifies the data elements used by DoN organic DMSMS forecasting tools.

## Schedule

DMSMS key activities must be tied to the Integrated Master Schedule (IMS) that should identify relationships and interdependencies between tasks. Examples include:

- Decision dates and milestones;
- Design reviews; and
- Bill of Material (BOM) load, reviews, and updates.

## DMSMS Management Structure and Team Members

Define specific roles and responsibilities for all primary program participants (including both internal and external members), and establish direct lines of communication to ensure integrated approaches to DMSMS issues. One way to support these objectives is to establish a DMSMS

working group or team within the program office or other program management activities. Provide list/Organizational Chart of the Team Members and Areas of Responsibilities, and address their responsibilities. Examples include:

- Program Office;
- Contracting Officer;
- Prime Contractor;
- Cognizant Engineering Activities; and
- Naval Supply Systems Command/Naval Inventory Control Point/ Marine Corps Logistics Command.

## PROCESS

### DMSMS and Technology Roadmap Integration

Describe how your DMSMS strategies consider the program technology roadmap, as well as industry technology roadmaps for embedded microelectronics (e.g., Semiconductor Industry Association (SIA) website http://www.sia-online.org/home.cfm). DMSMS issues may affect the timing of technology refreshment and/or technology insertion. The roadmapping process considers:

- Identification of critical items and technologies, including those that are emerging or planned, to meet program/warfighter needs;
- DMSMS forecasts and impacts (e.g., supportability, supply chain, Total Ownership Cost (TOC), performance) at the applicable system integration levels (e.g., platform, system/subsystem, equipment, assemblies and parts);
- Results of Business Case Analyses (BCAs) and decision criteria for selecting among the technology insertion and/or technology refreshment alternatives/opportunities and the associated cycles and schedules (see table 1);
- Development of Program Objectives Memorandum (POM) requirements and TOC estimates; and
- Periodic updates throughout the system's life cycle.

### System Architecture

Describe the system architecture as it pertains to DMSMS management. The program should map out system subassemblies or components that are not considered as DMSMS risks. For example, consumable items, forward-backward compatible items within the system architecture (e.g., certain routers, notebook computers, etc.), and other low risk items should be documented.

### Configuration Identification/Data Capture

Define your methodology for obtaining and documenting the BOM/piece-part level configuration for input into the predictive tools. Include a process for continuous BOM review and update.

Identify the data elements included in your BOM, including level of indenture, source(s), and repository. The essential elements of the BOM are identified in the sample DID, Appendix (A).

Provide rationale, results of BCA, or tradeoff analysis, if the piece-part(s) level cannot be supported.

**Design**

Describe the process used during the design phase to forecast, review and mitigate DMSMS impacts to the system (e.g., Parts and Material Selection, Preliminary Design Review, Critical Design Review, Provisioning Planning Conference, etc.).

**Identification & Prioritization of DMSMS Issues**

Describe the methodology for prioritization and mitigation of DMSMS issues. Describe how the DMSMS risks are integrated in the overall risk management program.

**Predictive DMSMS Tools**

Identify the predictive tools your program uses to forecast DMSMS and its relationship with any other tools/databases, including communication with the Government Industry Data Exchange Program (GIDEP) and the Shared Data Warehouse (plan for Sept 2005, see appendix C).

## DMSMS CASE MANAGEMENT

**Mitigation and Resolution**

Describe the process for integrating Reliability, Maintainability and Availability, usage rates, and asset availability into evaluation of mitigation alternatives.

Describe the process used to do the following:

- Receive an alert;
- Verify applicability (across system/platforms);
- Open a case;
- Research in-progress/completed solutions (Shared Data Warehouse);
- Determine/evaluate mitigation options (i.e., DMEA Solutions);
- Approve resolutions;
- Fund and implement resolutions;
- Resolve/Close case; and
- Update resolution to the Program Database/Shared Data Warehouse.

**Shared Data**

Describe the process to be used to archive and share DMSMS case and resolution data within the program and across other platforms (e.g., joint programs, similar systems used on different platforms).

**Metrics**

Document your relevant program metrics for managing DMSMS that includes the required metrics of Appendix (B).

# APPENDIX A
# BILL OF MATERIAL DATA ELEMENTS

## Sample DMSMS Source Data Sow

The contractor shall identify as applicable the parts planned to be used as well as those used in the product at all indentured levels. The data may be obtained progressively during any program life cycle phase using sources such as the preferred parts list, bill-of-materials, vendor surveys, inspections, etc. The information documented at the part level shall be updated as the design progresses or changes and should be sufficient to enable forecasting and management of any associated DMSMS issues.

## Sample Data Item Description *(for repetitive acquisitions/use)*

**Title:** SOURCE DATA FOR FORECASTING DIMINISHING MANUFACTURING SOURCES AND MATERIAL SHORTAGES (DMSMS)

**Number:**
**AMSC Number:**
**DTIC Applicable:** No
**Approval Date:** Draft
**Limitation:**
**GIDEP Applicable:** No
**Office of Primary Responsibility:** N, DASN-L
**Applicable Forms:** None
**Use/relationship:** The DMSMS forecasting source data is essential information that will enable the identification, forecasting and management of piece part obsolescence impacts and mitigations as a part of the DOD Program Managers' Total System Life Cycle Management responsibilities. This data is planned for use in DMSMS forecasting tools using a common data standard that enhances efficiency across programs that may share the data on common items. The data may be obtained during any program life cycle phase using sources such as the preferred parts list, bill of materials, vendor surveys, inspections, etc. This Data Item Description (DID) contains the format, content, and intended use information for the data product resulting from the work task described by the contract.

**Requirements:**

1. Format: The DMSMS Forecasting Source Data shall be in an editable electronic format using XML data standards.

2. Content: The DMSMS Forecasting Source Data shall include the following minimum information for the indentured level(s) specified by the contract:

**E-BOM Data Fields for System Level**
OEM Name
OEM CAGE
OEM Part Number
Revision Level
Firmware Version

Next Higher Assembly
Reference Designator
Nomenclature
Quantity on Platform
National Item Identification Number (NIIN)

**E-BOM Data Fields for LRU Level**
OEM Name
OEM CAGE
OEM Part Number
Known Alternate Part Numbers
Revision Level
Firmware Version
Next Higher Assembly
Reference Designator
Nomenclature
Quantity used in System
National Item Identification Number (NIIN)

**E-BOM Data Fields for LRU Component Level**
OEM Name
OEM CAGE
OEM/SCD Piece-Part Numbers
Next Higher Assembly
OEM/SCD Piece-Part Reference Designator
OEM/SCD Piece-Part Nomenclature
OEM/SCD Piece Part Quantity on LRU
OEM/SCD Piece Part Revision Level
OEM/SCD Piece Part Firmware Version
Actual Vendor Piece-Part Numbers
Actual Vendor Piece-Part Cage
Known Alternate Piece-Part Numbers & Cages
National Item Identification Number (NIIN)

# APPENDIX B
# DMSMS METRICS

**Program Name**
**ACAT Level**
**Program phase**
**DMSMS Point of Contact**

| FY04 (& previous) | Opened (qty) | Resolved (qty) | Closed (qty) | Number of BOMs in System | Number of BOMs Obtained/ Managed) |
|---|---|---|---|---|---|
| COTS/Modified COTS | | | | | |
| Other | | | | | |
| Total | | | | | |

| FY 05 | Opened (qty) | Resolved (qty) | Closed (qty) |
|---|---|---|---|
| COTS/Modified COTS | | | |
| Other | | | |
| Total | | | |

| Mitigation Resolution | FY04 (& previous) | | | | FY05 | | | |
|---|---|---|---|---|---|---|---|---|
| | Resolved (qty) | Closed (qty) | Est. Cost to resolve/close ($K) | Est. Cost avoidance ($K) | Resolved (qty) | Closed (qty) | Est. Cost to resolve/ close ($K) | Est. Cost avoidance ($K) |
| 1. Original component | | | | | | | | |
| - Existing stock | | | | | | | | |
| - Continue to Mfr | | | | | | | | |
| - Reclamation | | | | | | | | |
| 2. Alternate | | | | | | | | |
| 3. Substitute | | | | | | | | |
| 4. Life of Type Buy | | | | | | | | |
| 5. Aftermarket | | | | | | | | |
| 6. Emulation | | | | | | | | |
| 7. Reverse Engineering | | | | | | | | |
| 8. Redesign (minor) | | | | | | | | |
| 9. Redesign (major) | | | | | | | | |
| Total | | | | | | | | |

Has any case data been shared across the DoN in a shared data environment?
Observations, Trends, and Comments (for additional space expand text box or attach document)

Other. Refers to MIL-Spec, developmental, custom, etc. (e.g., items that are not COTS/Modified COTS)
Open Case. A case is opened when the program identifies that an item (e.g., piece part, LRU, etc.) is obsolete due to DMSMS or projected to be obsolete.
Resolved Case: A case is resolved when the mitigation action has been determined and the implementation process has been initiated but the action has not been completed.
Closed Case: A case is closed when the solution has been implemented and no further actions are required.
It is recognized that some programs have not been tracking metrics; in those cases they should provide the best estimate of DMSMS cases actually worked (e.g., 25 estimated cases) and cost (e.g., $15K or unknown).
Programs should use actual cost avoidance figures if known. However, DMEA cost models should be used as a default if not available. Ref DMEA DMSMS Acquisition Guidelines, chapter 2. Download at http://www.dmea.osd.mil

# APPENDIX C
# DEFINITIONS

**Bill of Material (BOM)**
A BOM is a list of all parts, sub-assemblies and raw materials that constitute a particular assembly, showing the quantity of each required item. An indentured BOM shows the relationships of components from component to board, to box, to system, generally in a top down break out format. A flat file BOM lists parts without indenturing relationships.

**Business Case Analysis (BCA)**
A BCA is a cost benefit analysis to determine the best value solution for meeting warfighter product support goals and requirements. Acceptable alternatives are analyzed for risks, cost and benefits to arrive at the optimum solution.

**Commercial and Government Entity (CAGE)**
A CAGE Code is a five (5) position code that identifies companies doing, or wishing to do, business with the Federal Government. The format of the code is the first and fifth position must be numeric. The second, third and fourth may be any mixture of alpha/numeric excluding I and O. All positions are non-significant. The CAGE Code is used to support a variety of mechanized systems throughout the government and provides for a standardized method of identifying a given facility at a specific location.

**Defense MicroElectronics Activity (DMEA)**
DMEA is the DoD's Executive Agent for integrated circuit (IC) microelectronics DMSMS activities, and the central activity for microelectronics in the Virtual Parts Supply Base (VPSB). DMEA develops and maintains an organic expertise in microelectronics technologies to assist requesting organizations in the identification and resolution of DMS problems within identified systems. Their capabilities include IC Design & Development, System Design & Development, Technology Assessment, Feasibility & Data Analysis, Computer-Aided Design/Computer Aided Engineering (CAD/CAE), Reverse Engineering and Component Testing

**Design Reviews**
Design reviews evaluate the technical progress of a system's design toward meeting specification performance requirements. As a product develops, it passes through a series of reviews of increasing detail. Each review is tailored to ensure that the emerging design is ready to enter the next stage of development. Each design review should have defined entry and exit criteria tied to the required level of design maturity and applied across all requirements and technical disciplines.

**Diminishing Manufacturing Sources and Material Shortages (DMSMS)**
The loss or impending loss of manufacturers of items or suppliers of items or raw materials may cause material shortages that endanger a weapon system's or equipment's development, production, or post-production support capability

**Government Industry Data Exchange Program (GIDEP)**
The GIDEP program provides for exchange of information relative to part manufacturing, testing, operation, and characteristic data among industry and government agencies, and may also be used as a primary source of information for identifying substitute parts and redesign criteria. The GIDEP database can be searched by NSN/Part Number to see if there has been a DMSMS alert for an item. Access to information is available through designated GIDEP representatives at subscriber organizations, both public and private, and Navy analysts should ensure coordination with their GIDEP representative to support DMSMS case investigations.

**Logistics Requirements Funding Summary (LRFS)**
A LRFS documents logistics funding requirements, allocations and shortfalls, by fiscal year, appropriation, etc. for a program

**National Stock Number (NSN)**
A NSN is a thirteen (13)-digit number assigned to an item of supply. It consists of the four digit Federal Supply Class (FSC) and the nine digit National Item Identification Number (NIIN).

**National Item Identification Number (NIIN)**
A NIIN is a unique nine character code assigned to each item of supply purchased, stocked or distributed within the Federal Government; when combined with the four character FSC it composes the NSN. The last nine digits of the NSN is the NIIN.

**Nomenclature**
The combination of an item name and type designation.

- Item name: A name published in Federal Cataloging Handbook H-1, or that name developed by the requester in accordance with MIL-STD-100, in that portion applicable to drawing titles.
- Type Designation: A combination of letters and numerals arranged in a specific sequence that provides a standard means of uniquely identifying electronic materiel by design configuration.

**Original Equipment Manufacturer (OEM)**
The OEM is the original manufacturer of an item (e.g., system, assembly or piece part)

**Provisioning Conference**
A conference for reviewing provisioning technical documentation/engineering data for provisioning, and for Government validation of support items and the assignment of technical and management codes.

**Reference Designator**
A method used to uniquely identify and locate discrete items/parts on diagrams and in a set; to correlate items in a set, graphic symbols on diagrams, items on a parts list circuit description and instructions. The three methods used for applying reference designators are Unit Numbering, Location Numbering and Location Coding methods.

**Shared Data/Shared Data Warehouse**
For a DMSMS program to be optimized, DMSMS data to include DMSMS cases and case resolution must be shared across the Department of Navy and Department of Defense. In addition, databases must be able to cross-reference and identify parts used in other platforms so that mitigation solutions can be optimized. Shared Data Warehouse is a DoD effort currently under development to ensure all Department of Defense DMSMS databases will share data. Review the DoD Center of Excellence (COE) website at **www.DMSMS.org** to view the latest status of shared data warehouse development.

**Technology Insertion:**
A change that incorporates the next generation product or product upgrade to an existing technology or component that improves overall system functionality. A technology insertion may require redesign of the next higher assembly, and re-certification.

**Technology Refresh:**
A change that incorporates a new product to avoid product end of life or product obsolescence or to correct a problem based on customer feedback. This refreshment may or may not have the same Form, Fit and Function ($F^3$), and can occur at any time in the life cycle. Re-certification or certification will be required.

**Extensible Markup Language (XML)**
XML is an open standard for describing data from the World Wide Web Consortium. It is used for defining elements on a Web page and business-to-business documents. It uses a similar tag structure as SGML and HTML; however, whereas HTML defines how elements are displayed, XML defines what those elements contain. HTML uses predefined tags, but XML allows tags to be defined by the developer of the page. Thus, virtually any data items can be identified, allowing Web pages to function like database records. By providing a common method for identifying data, XML supports business-to-business transactions and is expected to be the dominant format for electronic data exchange.